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New England

February
1957

Published monthly by the FEDERAL RESERVE BANK OF BOSTON

Taxation and Economic Growth
THE MASSACHUSETTS CASE

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Today most states find themselves pinched for adequate tax revenues. State tax collections averaged 15.0 per cent higher in fiscal 1956 than in the previous year, and expenditures rose 15.2 per cent. Local tax revenues rose an estimated 8.8 per cent. The cost of administering current programs is rising rapidly, and there are demands for new and improved state services and for aid to local communities pressed for new schools.

The problems of state and municipal finance in New England are not intrinsically greater than in the other 42 states. But resolutions of the problems are more urgently required. The manufacturing economy of New England is already laboring under the competitive disadvantages of lack of locally available raw materials and consequent high fuel, power and transportation costs. It cannot afford the additional man-made handicap of tax and spending programs that are anything less than

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stimulating to the growth of manufacturing activity. Fiscal policies that retard economic growth will create yet more severe fiscal problems. While studies indicate state and local taxes are secondary considerations in the rational selection of industrial sites, they can be decisive in a firm's selection between two or three otherwise best alternative sites.

The prosperity and growth of each of the New England states is important to each state in the region. To a surprising extent, businessmen outside the region attribute the achievements and failures of the individual states to the whole economy of New England. The whole region, therefore, will be affected favorably or adversely by the impact of state and municipal finance on economic growth in Massachusetts. At least a minimum of state and local government services and facilities are essential to stimulate manufacturing growth. But the adverse effects of government finance on manufacturing arise from taxes levied to pay for these services. This article examines the impact of Massachusetts' tax structure on its economic growth. While this relationship is not subject to precise measurement, it is possible to make comparisons and indicate relative attractiveness to business growth.

Massachusetts Taxes

Massachusetts is already widely known among businessmen as a high-tax state, and tax rates are frequently cited as a reason for not establishing plants, offices or other facilities in the state. Therefore, the threat of yet higher taxes, if they will be reflected in higher business costs, is not encouraging to the state's future development. Yet during the past fiscal year Massachusetts' net direct debt rose by $102 million, or 24 per cent, and state tax collections rose 11 per cent. Property taxes, collected by the towns and cities, were up 12.7 per cent in 1956. Estimates of the state government current revenue deficit for the coming fiscal year, assuming no change in current tax or spending programs, are for a minimum of 24 to 30 million dollars. Revenue needs for recommended programs run far ahead of this. There is a widespread feeling that a crisis has been reached and that either substantial new revenues will have to be collected from existing sources or new revenue sources must be found. Table I shows that in 1953, the last year for which nationwide data for local governments are available, per capita state-collected taxes in Massachusetts were about average relative to both all states and its chief competitors. Per capita local government tax collections, however, levied almost entirely against property including motor vehicles, were 50 per cent above the national average, and per capita total local and state taxes were 24 per cent above the national average.

TABLE I

TAX COLLECTIONS IN 1953

	RECEIPTS		RANK OF MASSACHUSETTS	
	Massachusetts	United States	Among the 48 States	Among its 11 Leading Industrial Competitors*
Per Capita State Tax Collections	$ 67.10	$ 67.74	23rd	6th
Per Capita State and Local Tax Collections	$166.24	$134.22	4th	4th
State and Local Taxes per Thousand Dollars of Personal Income	$ 89.77	$ 77.27	17th	2nd

*California, Connecticut, Illinois, Michigan, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee.
Source: Adapted from U. S. Bureau of the Census, **State and Local Government Revenue in 1953**, October 1954, Washington, D. C.

States with high per capita personal income are the more industrialized and urban states with greater needs for numerous public services. Also their citizens may demand and be willing to pay for more and better service. Tax collections as a portion of personal income are also a measure of tax burden. Combined state and local tax collections in Massachusetts per thousand dollars of personal income were 16 per cent above the national average. Of its principal industrial competitors, only South Carolina's $89.79 per thousand dollars of personal income was as high, while the corresponding figure was only $57.91 for Ohio and $62.05 for Pennsylvania.

Thus, the 1953 tax burden in Massachusetts was greater than in most comparable industrial states. From 1953 to 1956 state and local tax collections in Massachusetts have risen 23 per cent, only slightly less rapidly than the estimated national figure of 24 per cent. Personal income in Massachusetts has been rising less rapidly than in the nation, 7.6 per cent versus 8.2 per cent from 1953 to 1955. As a result, Massachusetts' relative tax burden is probably slightly greater now than in 1953.

In addition to looking at total tax collections, it is necessary to examine the particular taxes levied to see if the tax structure is such as to excessively burden business and thus hinder economic growth.

Personal Income

Personal income tax rates in Massachusetts are especially onerous on those who receive income from invested funds. Such income, as well as capital gains on intangibles, is taxed at the rate of 7.38 per cent. Hostility to this tax

is increased by its discriminatory aspects, since wage and salary earnings are taxed at 3.075 per cent. This suggests a popular and legislative hostility to financial investment income which makes businessmen dubious about the nature of future tax legislation. Personal antagonism toward the tax on the part of executives involved in plant location decisions and their estimates of its effect on attracting high-salaried personnel seem to be real, although perhaps "irrational," causes of some facilities not being located in Massachusetts. This is a case where emotional reaction to a tax may influence economic behavior far in excess of what seems reasonable in view of the dollar and cents amounts involved. While after-tax incomes from the same salaries might be just as large in Massachusetts as elsewhere—because other taxes would be higher or new ones imposed if there were no income tax, and state income tax payments are deductible in computing Federal income tax liability—these arguments are likely to have little influence in offsetting antagonism aroused by the peculiarities of the Massachusetts income tax.

Corporation Excise Tax

The Massachusetts corporation excise tax has often been criticized for its complexity, cost of computation, and uncertainty as to the amount of tax due. The law requires the computation of tax liability three ways, and payment of the largest of the three amounts obtained.

Two of the formulas for computation of tax due are: one-twentieth of one per cent of Massachusetts gross receipts; one-twentieth of one per cent of the value of the capital stock.

The third formula, and the one which usually yields the highest tax liability, is a combined income tax and tax on corporate wealth. There are also several alternatives to be computed in determining one's liability under this formula.

Corporate profits before Federal taxes are taxed at the rate of 6.765 per cent, including surtax. The tax on wealth is at the rate of $6.15 per thousand, including surtax, and is paid on whichever of two measures is greater. Usually the larger measure of wealth is the corporate "excess," but if the value of tangible personal property not taxed locally is greater than the corporate "excess," the tax is levied against such property. Manufacturers pay local taxes only on real estate and motor vehicles. Nonmanufacturers are also taxed locally on machinery.

Corporate "excess" is defined as "the fair value of its capital stock" less certain deductions. There are again two formulas for determining "fair value," both including the *actual* value of net assets. Determining one's precise tax bill involves endless points of dispute and uncertainty and frequently is settled only by negotiation with the tax commission.

TABLE II

TOTAL OF STATE AND LOCAL TAXES FOR 1951 AS A PER CENT OF TOTAL NET INVESTMENT

Sample of 54 Corporations

	Per Cent		Per Cent
Wisconsin	4.34	Maryland	2.60
Massachusetts	4.28	Connecticut	2.35
Pennsylvania	3.50	Michigan	2.30
New York	3.46	Indiana	2.15
California	3.46	New Jersey	1.90
Virginia	3.30	Illinois	1.56
North Carolina	3.13	Ohio	1.37
West Virginia	2.71	Delaware	0.57

Source: Commonwealth of Pennsylvania, The Tax Problem, Report of the Tax Study Committee, May 1953, p. 145.

As for the tax liability itself, Massachusetts' rate of 6.765 per cent of income before Federal taxes is the highest effective rate in the country.[1]

The entire Massachusetts corporate tax is traditionally viewed as an income tax. If the tax on "excess" or tangible property is regarded as a property tax, however, Massachusetts firms still pay the highest effective state income tax rate in the country (6.765 per cent), and their property is taxed about 60 per cent more than the amount of their local tax bills.[2]

If the entire corporation excise tax is regarded as a tax on income, the *rate* of taxation will vary with the level of employment and profits. For all firms whose excise tax bill was based on income plus "excess" or tangible personal property, the rate of taxation of income before Federal taxes has fluctuated between a low of 9.5 per cent in 1952 and a high of 10.8 per cent in 1955 and 1956.

The differences in the impact of this tax upon different types of business are substantial. A survey of tax returns for 1949, when the income tax levy was only 6.21 per cent, showed that the average manufacturing firm's total corporation excise tax was 8.5 per cent of income. Retail, wholesale and service businesses paid a slightly

[1] The Oregon tax rate of 8 per cent minus an offset of 50 per cent of the amount of personal property taxes paid works out to a slightly lower average rate of taxation. Idaho's 8 per cent rate applies only to net income *after the payment of Federal taxes*, thus giving an effective rate of less than 4 per cent, while Wisconsin allows the deduction of Federal taxes up to 10 per cent of income, so that its rate of 7 per cent comes to a maximum of about 6.3 per cent of net income.

[2] Based on 1953 assessed value of properties of manufacturing firms of $423,355,330, state-wide ratios of property taxes levied to assessed value, and collections from "excess" and tangible property sections of corporation excise tax, 1953-55.

higher per cent. When manufacturers were classified into 34 industry groups, corporate excise taxes ranged from 11.2 per cent of income for meat packing and 11.1 per cent for hosiery and knitted goods to 7.3 per cent for bakeries. For individual companies the fluctuations are much greater. There may be a large tax bill even when the firm makes a loss.

A study for the Pennsylvania legislature[3] determined the ratio of state and local taxes to book value of investment for 54 corporations with comparable properties in Pennsylvania and non-Pennsylvania locations. The results, given in Table II, showed that only Wisconsin taxes imposed a burden comparable to Massachusetts.

Property Taxes

Property taxes in Massachusetts are levied only by local governments, and only real estate, motor vehicles and the machinery of nonmanufacturers are so taxed.

Manufacturing Firms

A reasonably representative sample of twenty Massachusetts manufacturers opened their books to a state commission and provided blueprints and other material necessary for computing their potential tax bills if their plants had been located in other states.[4] Seven states were selected for comparison. In order to include local taxes, a specific city was selected in each state.

Table III shows that the total tax burden for the median firm was greater in its Massachusetts location than it would have been in five of the seven cities used for comparison. Relative to Paterson, New Jersey, Massachusetts taxes were 42 per cent higher. Massachusetts taxed income and capital far heavier than any of the others. Real estate taxes were generally higher in Massachusetts but total property taxes much lower.

Property taxes and therefore total taxes in Massachusetts are undoubtedly underestimated in this study since many firms were located in smaller communities than the non-Massachusetts location. Except for this, total Massachusetts taxes might well have been higher than in any of the seven cities. Property taxes as a per cent of all taxes for the median firm were 57 per cent in Charlotte and 80 per cent in New Haven.

Nonmanufacturing Firms

The most detailed study of Massachusetts property taxes was done by the Massachusetts Federation of Taxpayers Associations,[5] comparing taxes in Boston with other cities, including some figures on other Massachusetts locations. The accompanying chart shows that the 1953 Boston tax burden on office building space was then more than two and a half times the national average and substantially above that of other large cities.

Property taxes were 63.6 per cent of gross rental income for retail stores in Boston in 1953, while for eight other Massachusetts cities and towns, five of which were in the Boston Metropolitan Area and three of which were in the Springfield Area, the corresponding percentage was 26.9. For a sample of United States cities in nine states the percentage was 23.7.

Measuring the burden on hotel room rentals, the real estate tax per hotel room in Boston in 1953 came to $385 per room, while for the New England and Middle Atlantic states the average tax per room was $184.11 and the national average was $156.31. As a per cent of room sales, real estate taxes amounted to 16.8 per cent in Boston while the average for 276 United States hotels was 7.2 per cent.

When the average ratio of sales prices to assessed value of commercial property was determined for various cities and the tax rate then adjusted to represent the real rate per dollar of market value of the commercial property, the Boston tax rate per $1,000 of market value was computed as $88.02. For other cities the corresponding figures were: New York, $33.79 in Manhattan and somewhat less in the other boroughs; Pittsburgh, $34.41 for properties in the new "Golden Triangle" and $28.07 for low grade commercial and industrial property combined; a

TABLE III

COMPARISON OF ESTIMATED TAXES PAYABLE BY TWENTY CORPORATIONS IN EIGHT STATES IN 1950 BY BASIC TAX MEASURES

Index: Massachusetts = 100

Figures for Median Firms

	Total Real Estate Tax	Total Property Tax	Income and Capital Taxes	Total Taxes
Massachusetts	100.0	100.0	100.0	100.0
Philadelphia, Pa.	90.0	90.0	66.5	71.5
South Bend, Ind.	43.5	204.5	8.6	80.6
Buffalo, N. Y.	127.5	127.5	54.0	75.0
Charlotte, N. C.	64.6	182.5	78.5	113.0
New Haven, Conn.	95.0	311.0	29.5	104.5
Paterson, N. J.	99.0	277.0	4.0	68.9
Lansing, Mich.	65.5	296.5	16.5	97.5

Source: Commonwealth of Massachusetts, Report of the Special Commission on Taxation, Part IV, (House No. 2611, June 1951).

[3] Commonwealth of Pennsylvania, Report of the Tax Study Committee (*The Tax Problem*, May 1953).

[4] Commonwealth of Massachusetts, Report of the Special Commission on Taxation, Part IV (House, No. 2611, June 1951).

[5] Massachusetts Federation of Taxpayers Associations, *Property Tax Study, Part I, Tax Burden*, 1954, unpublished study.

group of ten cities in New Jersey, from $49.82 in Jersey City to $28.11 in Trenton, with Paterson $33.05 and Newark $39.44; Buffalo and Rochester $33.50; Chicago $25.55, and Charlotte, North Carolina, $8.00.

For apartments containing more than four units, the ratio of 1953 property taxes to total rental income was 28.6 per cent in Boston, 21.4 per cent in seven other Massachusetts cities and towns, 18.9 per cent in Chicago, 17.1 per cent in New York City, 12.3 per cent in Philadelphia and 10.6 per cent in Pittsburgh.

These and other data indicate that the property tax burden is extremely bad in Boston and high in other Massachusetts areas. Looking at property tax collections per capita, Massachusetts' $94 in 1953 was exceeded only by that of New Jersey, which was very slightly higher. In 1956, per capita property taxes were $109 in Massachusetts and $107 in New Jersey.

Assuming assessment of a new building in Boston or elsewhere was 60 per cent of cost, Boston's $80 tax rate would levy an annual charge of 4.8 per cent against initial investment, while another city's $40 rate would be a 2.4 per cent charge against investment return. Investment in Boston is even less attractive than these figures suggest because of an unfavorable reputation for assessment practices. Boston is unique among major cities in not having had a hotel or general office building constructed since 1927. It is the only one of 52 cities in which the total value of real estate declined during 1955, according to the National Association of Assessing Officers.

Total nonresidential construction in the Boston metropolitan area, excluding public works, from January 1, 1946, through November 30, 1956, amounted to $401 per capita, while for 34 other cities in the Northeast such construction totaled $664.[6] If the Boston area had built at the rate of these other cities, it would now have an additional $600 million of postwar construction!

Boston lost an even greater amount of business property since an exceptionally large proportion of new building in the Boston area has been tax-exempt property of religious, educational and medical institutions. During the same period, per capita construction of commercial and manufacturing buildings amounted to $162 for Massachusetts, $176 for New England, and $242 for the 37 states east of the Rockies.

Conclusions

Table III shows that, despite an underestimate of Massachusetts property taxes, the burden of taxes on manufacturing corporations was greater in Massachusetts than in five of the seven alternative locations. It also shows the substantially heavier burden of the corporation excise tax than of any comparable taxes in these other states.

The available evidence supports the conclusion that the average Massachusetts manufacturer pays about the same amount in property taxes as his competitors in other states, but much higher taxes on income and capital. Some less fortunate firms in Boston and elsewhere pay exceptionally high property taxes.

Measuring the precise impact of these taxes on investment and economic growth is impossible because of the many factors involved. However, it does seem clear that taxation of business in Massachusetts is already sufficiently high relative to competing industrial states that it would be unwise to meet demands for new tax revenue by increasing property or corporation taxes.

The greatest criticism of the personal income tax is its present rate structure, which bears heavily on income from investment. Any revenue loss from taxing all income at the same rate could be met by raising the rate or changing present exemptions and deductions. A progressive rate structure would require amending the state constitution.

Efforts to raise large amounts of additional revenue by changes in the personal income tax could push Massachusetts into unhappy prominence as the state that taxes personal income most heavily. When added to the present pattern of taxing property and corporations, such a change would intensify the adverse impact of taxation on economic growth. Massachusetts must carefully consider all alternative revenue sources that have been tested in other states.

[6] Construction data in this and the following paragraphs were provided by the F. W. Dodge Corporation.

Research Shapes New England's Economy

PART III: INDUSTRIAL RESEARCH

Industrial research has long provided a strong base for manufacturing activity in New England. Many of the region's early factories were established to take advantage of inventions by such men as Eli Whitney, Samuel Colt, Elias Howe, and Charles Goodyear. In an earlier period, new products and processes generally resulted from discoveries by individuals working alone or with a small group of helpers. Today the era of the independent individual inventor has largely passed. Teams of researchers, working in consulting groups and universities or more frequently on the payrolls of manufacturing firms, now contribute most of the new industrial products and production techniques that have led to much of the recent growth in the New England economy.

Industrial research is particularly important to New England. Most of the region's basic income comes from manufacturing activity. But New England has no great mineral resources or large supplies of cheap power to attract heavy industry. Transportation costs generally prohibit the manufacture of bulky or heavy products for national distribution. New England, therefore, depends more than most regions on production of goods which have a high value added by skilled craftsmen, and on specialty goods or new products originating from scientific research.

Research has played several roles in the recent growth of the New England economy. It has become a growing and profitable industry in itself. More important, however, has been its role in providing the basis for the establishment of many new concerns, as well as the enlargement or shift in emphasis of innumerable existing firms to manufacture new products. The research facilities and personnel of the region's universities, government installations, private consulting laboratories, and manufacturing concerns have also led to the establishment in New England of new research and development facilities by many national concerns to obtain the advantages of proximity to the large supply of research institutions and people in the area.

To obtain a quantitative measure of the amount of industrial research being carried on in New England, its characteristics, and the advantages and disadvantages of the region as a location for research and development activities, this bank recently conducted a questionnaire survey of over 3,500 New England manufacturers.

New England manufacturers spent over $330 million in 1955 on research and development projects. This is about two and a half times the amount spent in 1950, indicating the rapidly growing importance of research in New England.

Durable-goods industries account for the major part of research and development expenditures among New England manufacturers. They spent almost $294 million in 1955. Manufacturers in the electrical-machinery industry, with expenditures of $117 million, had higher research and development costs than any other industry. The communications-equipment industry (which includes most, but not all, electronics plants) channeled $78 million into research and development work. The instruments and nonelectrical-machinery industries ranked next in size of research and development expenditures, each spending more than $50 million in 1955. The transportation-equipment industry had a $30 million program and the fabricated metals and ordnance industries combined spent $26 million.

Expenditures for research and development purposes in the nondurable-goods industries were generally much lower than those for hard-goods producers in 1955. Chemical manufacturers comprise the only soft-goods industry which spent over $10 million. The miscellaneous nondurables, paper and rubber industries are the only other nondurable producers who spent over $1 million.

Increase Since 1950

Research and development spending increased between 1950 and 1955 in every industry for which comparable figures are available.

Firms in the electrical-machinery industry spent nearly three times as much in 1955 as they did in 1950. The next largest dollar increase occurred in the instruments industry, which boosted research and development costs by $31.5 million and more than doubled such expenditures from 1950. Nonelectrical-machinery firms increased research and development spending by more than $25 million, considerably more than all remaining durable-goods producers in absolute terms. In terms of rate of growth, however, the nonelectrical-machinery industry was the only hard-goods industry which failed to

double research and development spending.

The chemicals industry had an increase of over $6 million, almost one-third of the total rise for the soft-goods group. The paper, rubber and miscellaneous nondurables industries more than doubled research and development outlays between 1950 and 1955.

Basic Research Expenditures

Basic or fundamental research is concerned primarily with the development of a fuller understanding of the field being studied and, as such, is not directly associated with the development of specific products or processes. Basic research carried on by private industry is of paramount importance in providing the foundation for promising applied research projects by increasing over-all scientific knowledge in areas of general interest to the firm. A comprehensive analysis of basic data may often determine the direction and limits of applied research efforts.

New England manufacturers devoted $29.5 million, or about nine per cent of total research outlays, to basic research in 1955. This compares with slightly more than four per cent going for basic research purposes among manufacturers throughout the United States in 1953.

Durable-goods industries accounted for about four-fifths of expenditures allocated to basic research programs by New England firms. The electrical-machinery industry stood well above all others with a total expenditure of $9 million for basic research. In the same industry the proportion of total research and development costs allocated to basic research was eight per cent. The transportation-equipment, primary-metals and fabricated-metals and ordnance industries in the durable-goods group allocated the largest proportions of total research and development expenditures to basic research.

The proportion of research and development costs allocated to basic research averaged over 17 per cent among nondurable manufacturers, nearly twice that for the durables group. In the chemical industry expenditures amounted to 2.5 million or about 40 per cent of the total basic research outlays by soft-goods producers. The miscellaneous nondurable and rubber industries had basic research expenditures exceeding $1 million.

Spending for basic research in 1950 (excluding the transportation industry, for which figures are not available) amounted to $8.5 million, or about seven per cent of the cost of all research programs in that year. This is slightly more than one-third of the basic research in the same industries during 1955. The hard-goods industries accounted for 69 per cent of basic research expenditures in 1950.

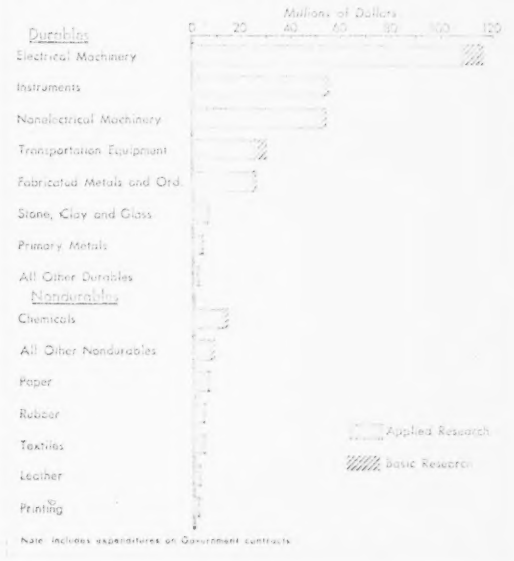
Government-Financed Programs

Research and development programs carried on by private industry, but financed by the Federal Government, account for a significant part of research and development spending in New England. The bulk of such spending is concentrated in the hard-goods industries, particularly among those most closely associated with defense production. In 1955 Government-financed projects accounted for over half of all research and development expenditures in the electrical-machinery, transportation-equipment, fabricated-metals and ordnance industries. Among instruments producers, over one-third of all research efforts were financed by the Government. Between 15 and 20 per cent of research and development spending in the primary-metals and nonelectrical-machinery industries was financed in the same manner. The rubber industry was the only nondurable category where such work accounted for as much as 20 per cent of research and development expenditures during 1955.

Research-to-Sales Ratios

Research and development expenditures of survey participants conducting such programs amounted to 4.1 per cent of their sales in 1955 compared to only 2.6 per cent in 1950. The ratio in the durable-goods industries in 1955 was

Research and Development Expenditures
by New England Manufacturers in 1955



Note: Includes expenditures on Government contracts.

6.8 per cent, much higher than the ratio of 0.6 per cent for the nondurable-goods industries. Comparable ratios for 1950 are 4.5 per cent for the durables and 0.3 per cent for the nondurable-goods industries.

The large proportion of research and development spending financed by the Federal Government helped raise the research and development-to-sales ratios in the durable-goods industries. The electrical-machinery and instruments industries had the highest research-to-sales ratios in both 1950 and 1955. The ratio for makers of electrical apparatus was 12.1 per cent in 1950 and reached 15.3 per cent in 1955. Research and development expenditures of instrument producers increased from 8.4 per cent of sales in 1950 to 10.4 per cent in 1955.

New Products Resulting from Research

The development of new and improved products and processes is vital to the existence and growth of both individual firms and industries in New England. Most industrial research programs are directed toward this end. The success of New England industries in developing better products and more efficient methods is reflected in the rapidly increasing share of total sales derived from products developed in the post-World War II period.

In the five years after World War II new products from research were introduced rapidly. According to the respondents in the survey, sales of products developed since 1945 accounted for more than one-third of 1950 sales in the electrical-machinery industry. In the instrument and nonelectrical-machinery industries the ratio exceeded 20 per cent. The chemicals industry, with sales of products developed since 1945 amounting to nearly 28 per cent of all sales in 1950, was far ahead of all others in the nondurables group.

By 1955, sales of products developed since 1945 accounted for a much larger share of total sales in each of the manufacturing industries. The proportion had more than doubled for all durables classifications. The electrical machinery industry continued to lead the field with over 70 per cent of total sales derived from new products. Sales of new products in the transportation-equipment and instruments industries also exceeded 50 per cent of total sales.

Firms in four of the seven soft-goods industries more than doubled the proportion of sales from new products between 1950 and 1955. Only among chemicals firms, however, did sales of new products approach half of total sales.

Advantages and Disadvantages of New England as a Location

Cooperating manufacturers cited nearness to educational institutions and other research organizations and availability of qualified personnel as the major advantages of the present New England locations of their research-development facilities. One or more advantages were mentioned by 107 firms, and sixty-seven firms reported disadvantages.

More than half of the respondents feel that qualified research personnel are more readily available in New England than in other areas. Over 40 per cent of the participating firms singled out nearby educational or other research facilities as important advantages of their present location in New England. These factors were mentioned by a somewhat larger proportion of firms in the Boston area than in other sections of New England.

Among other advantages, desirable living conditions, proximity to customers or suppliers, good transportation facilities, and location of research facilities in or close to manufacturing plants were emphasized most often. Nearly 20 per cent of the reporting firms specifically praised living conditions in New England. About the same proportion feel that transportation facilities are more than adequate, and that their research and development facilities in New England are conveniently located in relation to customers or suppliers. Thirteen per cent pointed to the advantage of having research and develop-

ment facilities close to existing manufacturing plants in the area. Again, the proportion of Boston area firms reporting these advantages was somewhat above that for those located elsewhere in New England.

Additional advantages such as good water and power supplies, equitable wage scales, suburban locations and reasonable living costs were mentioned by a smaller number of firms.

Disadvantages of the present location of their research and development facilities in New England were reported by manufacturers with less than one-half the frequency of advantages. Remoteness from customers or suppliers and poor business climate are the disadvantages listed most often. But less than one-fifth of the reporting firms feel that New England suffers the disadvantages of being outside the area of primary markets or supply sources. Approximately 15 per cent of the firms cited inequitable tax structures, poor community attitudes and services or outdated and restrictive zoning laws as obstacles to the establishment of research and development programs in New England. Firms in the Boston area reported less concern about distance from customers and suppliers, but nearly one-quarter of these firms expressed some dissatisfaction with the general business climate.

The only other factor reported as a disadvantage by a significant number of firms is the tight labor market. Just over ten per cent of the respondents, all outside the Boston area, believe the labor shortage is more acute in New England than in other areas.

Conclusions

The great expansion in research and development programs of New England manufacturers between 1950 and 1955 has contributed significantly to the over-all industrial growth of the area. The survey results indicate that the value added in manufacture of products developed since World War II now exceeds 30 per cent of New England's total value added in manufacturing. Among durable-goods producers, where the bulk of research and development spending is concentrated, nearly 45 per cent of value added is accounted for by products developed since 1945. The proportion in the soft-goods group is about 17 per cent.

Judging from the respondents in this survey, the six industries which allocate the largest dollar amounts to research and development programs account for nearly 90 per cent of total industrial research and development spending in New England. While they accounted for about 40 per cent of total value added by manufacturing in New England in 1954, they contributed about two-thirds of value added in the manufacture of recently developed products. Moreover, employment in these industries expanded by nearly 18 per cent between 1950 and 1955. That gain accounted for 85 per cent of the total expansion in employment among all manufacturing industries which recorded an increase in employment during the period.

Research and development programs financed by the Federal Government constitute approximately one-third of total research and development spending among New England manufacturers. While many new commercial products and entirely new firms have been developed on the basis of work done on Government-financed research and development contracts, there is an obvious danger in high dependence on Government contracts. A reduction in such contracts may seriously hamper or cripple the research and development programs of many firms and slow the growth rate of these industries which have contributed to recent economic gains.

Apart from Federally-financed research and development work, however, a trend toward greater emphasis on research and development is clearly evident among New England manufacturers. Most firms conducting research and development programs, and many of those who are not at this time, generally seem convinced that such work will continue to become increasingly important for success.

Technical Note

For the purposes of this study, research and development activities were defined to include basic and applied research in the sciences and in engineering and design and development of prototypes and processes. Expenditures for nontechnological activities and technical services such as quality control, routine product testing, market research, sales promotion, and research in the social sciences were specifically excluded.

Data presented in this article are based on reports submitted by 650 manufacturing firms which participated in a survey of industrial research and development spending in New England conducted during November 1956. Over one-third of these firms reported that they conduct research and development programs.

Spending totals were obtained for each industry by projecting the figures provided by sample firms on the basis of the relationship between their employment and total employment in their industry group.

The ratios of research costs to sales and new product sales to total sales reflect only the experience of sample firms but are generally indicative of the pattern existing in New England industries.

Christmas Sales Reach New High

A tremendous surge of last-minute buying enabled New England's department stores to surpass the record volume of Christmas season sales set in 1955. During the six-week period commencing with Thanksgiving week and ending December 29, sales were three per cent larger than for the corresponding period a year ago.

Thanksgiving week sales exceeded the corresponding week of 1955 by one per cent. Each of the next three weeks saw sales lag four per cent behind year-earlier levels. Calendar influences were at least partly responsible for this lag. Nineteen hundred and fifty-six was a "Leap Year." Christmas this time fell on a Tuesday compared with Sunday in 1955. The Monday before Christmas was an extra day in the Thanksgiving to Christmas Season. In the week-to-week comparison during the Christmas shopping season, Christmas this year was always one shopping day farther away. The effect was noticeable when sales were rising sharply. The chart below shows that sales this season did not lag far behind last year's after allowing for date changes.

Sales for the week ending December 22 were 15 per cent greater than a year ago and set an all-time record volume of sales for any week, nine per cent larger than the previous high. Last year the comparable week ended on Christmas Eve. With Christmas falling on Tuesday in 1956, apparently a great many people had delayed their shopping, planning to make full use of the last week-end to get their shopping done. Sales on Monday, while by no means the largest selling day of the season, set a record for day-before-Christmas volume. Many plants and offices were closed that day, allowing employees to do their last minute shopping. Sales in New England stores that week were 35 per cent greater than a year earlier, largely due to Monday's sales. There were five shopping days in the week in both years.

The plant and office closings appear to have benefited suburban stores more than those downtown. For Christmas week, sales of suburban Boston stores were 77 per cent larger than a year ago. Downtown, sales gained only 19 per cent.

Homefurnishings departments turned in the best comparative performances against last year, judging by the experience of downtown Boston stores. This is the second year this department has had the largest gain, reflecting the increasingly competitive merchandising being done on these items by department stores. In sales of toys and games, however, the vast variety and number of outlets handling these items ate into department store volume this year. Price reductions on toys took place quite early in the Christmas season but did not bring in enough more sales to bring dollar volume up to last year's level at department stores. Sales of women's and misses' apparel compared more favorably with last year's volume of sales than did sales of accessories. Sales of men's and boys' wear and of piece goods and household textiles lagged several percentage points behind sales in the 1955 season. Very little difference was noted between the comparative performances of basement and main stores relative to year-earlier sales levels.

The gains registered during the Christmas Season, although perhaps not as large as had been hoped for earlier, should provide encouragement for district retailers. Consumers still seem to be willing to spend, and give some indications of desiring higher quality merchandise. Nonetheless, they still keep an eye on prices.

COMPARISON OF CHRISTMAS SEASON SALES
NEW ENGLAND DEPARTMENT STORES
Corresponding Weeks 1956 vs. 1955

City or Area	Per Cent Change 1955 to 1956						
	Weeks ending in 1956						Six Weeks Total
	Nov. 24	Dec. 1	Dec. 8	Dec. 15	Dec. 22	Dec. 29*	
Boston Area	− 1	− 4	−4	−4	+13	+ 36	+3
Downtown Boston	− 5	− 7	−5	−3	+13	+ 19	0
Suburban Boston	+ 7	+ 4	−4	−5	+14	+ 77	+7
Cambridge	+ 4	+ 7	−3	−9	− 6	+ 95	+8
Lynn	− 7	− 2	−5	−3	+ 7	+ 89	+1
Quincy	+ 3	+11	−3	−4	+ 9	+101	+7
Lowell Area	0	− 1	−3	−9	+ 9	+ 59	+3
Springfield	− 6	+ 1	−2	−4	+22	+ 50	+6
Providence	+10	− 9	−8	−8	+14	+ 26	0
Other Cities	+ 7	+ 2	−3	+1	+22	+ 46	+9
District	+ 1	− 4	−4	−4	+15	+ 35	+3

*The large gains for this week reflect in part the fact the 1956 week contained one pre-Christmas shopping day whereas there were none in the 1955 week. There were five shopping days in the week in both years.

Manufacturing Trends in New England

The Paper and Allied Products Industry

New England's paper and allied products industry has expanded output more than 25 per cent in the past seven years. That rate slightly exceeds the all-manufacturing growth in New England but falls short of the expansion rate in the United States counterpart industry. As of November 1956, the New England industry had posted a 12-month gain of three per cent contrasted with a United States gain of two per cent for the same industry.

These findings are the first results of the new regional index for the New England paper and allied products industry released in the January *New England Business Review*. Previously, the most comprehensive indicator of trends in this industry was tonnage output data for paper and board mills. Those statistics do not include the output of mills producing glazed and coated papers, envelopes, paper bags, paperboard containers and boxes, pulp goods and miscellaneous products, and they only indirectly measure the output of pulp mills. Also, these tonnage figures are not weighted by value of product.

The new index overcomes these defects. It includes all subgroups in the paper and allied products industry and is weighted by the relative value of each product. It will be available on a seasonally adjusted basis about four weeks after the end of each month.

This index was constructed by gathering value of output data and kilowatt hour and man-hour input data for the years 1950-1954 from firms accounting for over 35 per cent of total output in the industry in New England. From this data, a formula for estimating output from kilowatt hour and man-hour input was determined by statistical analysis.

Electric utilities and the Federal Reserve Bank of Boston now collect kilowatt-hour data from firms using almost half the electrical energy consumed in the paper and allied products industry in New England. State agencies and the Boston office of the Bureau of Labor Statistics gather man-hour statistics from firms responsible for well over half the total employment in the industry. This data is inserted in the estimating equation to calculate the monthly index of output which is subsequently adjusted for the normal seasonal variation in output.

This seasonal adjustment calculation is particularly significant in September, October, November and July. In the fall, production is usually three or four per cent above the monthly average for the year; in July, when mills shut down for annual maintenance work, production normally slumps by more than seven per cent.

Growth in New England

Production has increased slowly in Massachusetts compared with the region as a whole. Excluding Massachusetts, growth in the remaining five New England states has approximated the national growth rate. Although output in New England's paper industry declined last fall, the index for each month in 1956 was higher than for every corresponding month in 1955. The expansion programs of pulp and paper companies in northern New England—particularly in Maine—may be credited for this good showing.

With one exception during the last seven years, this industry has had a record of stability in New England. That exception was in 1951-52. During a 12-month period beginning May of 1951 many buyers of paper and paperboard and their many products liquidated a large fraction of the inventory they had accumulated in the previous two years in anticipation of wartime scarcities. In contrast, during the slight recession in 1954, production in Massachusetts declined slightly, but the index of production for the region as a whole did not falter.

INDEXES TO BE REVISED

Revised data for both the Massachusetts and New England manufacturing indexes will be published in a forthcoming *Business Review*. This revision will incorporate changes of two types. Most industries will be affected by use of new benchmark data covering man-hours worked in Massachusetts. The revision will affect the level of the indexes back as far as January 1954.

The revised data will also reflect an improvement in the basic techniques of establishing industry benchmarks. The present output series is calculated from kilowatt-hour and man-hour relatives on a 1950-52 base. Because the estimating equations are not homogeneous, the resultant output index may not average out to 100 for the 1950-52 period. The revised data will be recalculated on a 1950-52 base to permit direct visual comparison with other series having the same base period.

MANUFACTURING INDEXES (seasonally adjusted)	MASSACHUSETTS (1950–52 = 100)			NEW ENGLAND (1950–52 = 100)			UNITED STATES (1947–49 = 100)		
		Per Cent Change from:			Per Cent Change from:			Per Cent Change from:	
	Nov. '56	Oct. '56	Nov. '55	Nov. '56	Oct. '56	Nov. '55	Nov. '56	Oct. '56	Nov. '55
All Manufacturing	113	+ 1	− 1	117	+ 1	+ 1	147	0	+ 1
Primary Metals	116	+ 4	+ 6	104	− 4	− 4	147	0	− 1
Textiles	60	0	−17	76	− 1	−12	103	− 4	− 6
Leather	115	+15	−11	112	+ 3	−10	104	+ 4	+ 3
Paper	108	+ 1	− 1	118	+ 3	+ 3	160	+ 1	+ 2

	NEW ENGLAND			UNITED STATES		
		Per Cent Change from:			Per Cent Change from:	
	Nov. '56	Oct. '56	Nov. '55	Nov. '56	Oct. '56	Nov. '55
BANKING AND CREDIT						
Commercial Loans ($ millions) (Weekly Reporting Member Banks)	1,476	0	+12	29,071	+ 2	+16
Deposits ($ millions) (Weekly Reporting Member Banks)	4,225	− 1	+ 1	93,161	0	0
Check Payments ($ millions) (Selected Cities)	7,820	− 3	+ 9	185,207	− 4	+ 7
Consumer Installment Credit Outstanding (index, 1950–52 = 100)	215.3	0	+13	208.7	+ 1	+10
TRADE						
Department Store Sales (index, seas. adj. 1947–49 = 100)	119	+ 4	+ 3	131	+ 7	+ 7
Department Store Stocks (index, seas. adj. 1947–49 = 100)	130	− 1	+ 6	143	+ 1	+ 9
EMPLOYMENT, PRICES, MAN-HOURS, & EARNINGS						
Nonagricultural Employment (thousands)	3,663	0	+ 1	52,418	0	+ 2
Insured Unemployment (thousands) (excl. R. R. and Veterans programs)	77	+17	+19	966	+10	+15
Consumer Prices (index, 1947–49 = 100)	118.5 (Mass.)	+ 1	+ 4	117.8	0	+ 2
Production-Worker Man-Hours (index, 1950 = 100)	96.6	− 1	− 3	111.1	− 2	0
Weekly Earnings in Manufacturing ($)	73.26 (Mass.)	0	+ 3	82.42	+ 1	+ 4
OTHER INDICATORS						
Construction Contract Awards ($ thousands, 3-mos. moving averages)						
Total	131,375	− 9	−18	1,659,190	− 8	−11
Residential	53,020	−13	+ 7	577,274	−15	−22
Public Works	22,248	− 3	−57	326,309	+ 7	+ 7
Electrical Energy Production* (index, seas. adj. 1947–49 = 100)	176.8	0	+ 5	221.9	+ 1	+ 5
Business Failures (number)	42	−30	+11	999	−14	+ 6

*figure for last week of month